Management of acute severe intractable post-operative pain after brachial plexus avulsion injury – a case report

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Introduction

Brachial plexus avulsion injuries are one of the severe injuries among peripheral nerve injuries. We report a case of brachial plexus avulsion injury who experienced severe intractable pain following surgery requiring early high dose multimodal analgesia and multidisciplinary team management unlike most patients presenting with post-operative pain.

Description

17-year-old male sustained poly-trauma following a motorcycle accident. He had a background history of significant psychosocial issues including ADHD as a child, depression and delusional thoughts. His injuries included fracture femur which required nailing, traumatic SAH and brachial plexus injury.

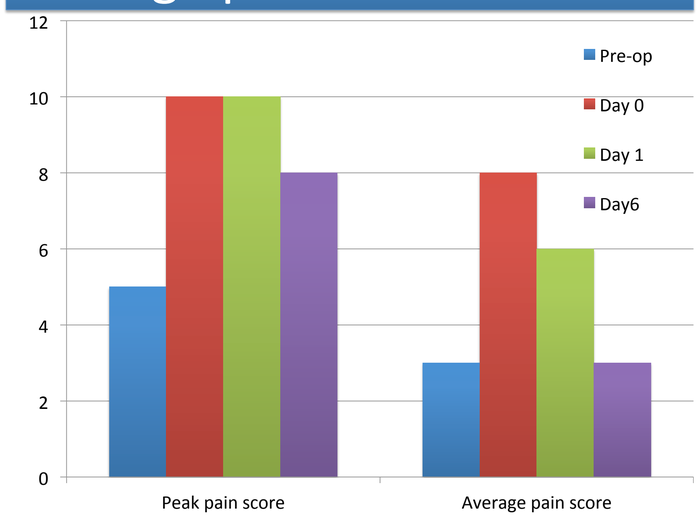
The MRI scan showed parenchymal shear injury and associated acute traumatic syrinx formation from C4/5 to C7 cord. There was associated intraspinal dural tear with csf leak. There was impression of subtotal avulsion injury of left C7, T8 and T1 roots.

He developed allodynia below C5/6 after a week in hospital. Pain was controlled with oxycodone and pregabalin with fentanyl PCA. Increasing pain on later days needing increasing doses of PCA and pregabalin. He was stabilised on lidocaine patch, oxycodone MR, oxycodone IR and started on citalopram. His pain was recorded as 3/10 at rest and 5/10 on movement.

Surgery was carried out in our tertiary centre with the aim of restoring motor function. On exploration, he had undisplaced avulsion of C5, C7 and C8. On approach to C8 root, a dural tear was noted which required sealing of the csf leak.

Post op, on waking in recovery, the patient described extreme pain in the upper limb in recovery requiring multiple doses of morphine, oxycodone and clonidine. In HDU post op, he had 10/10 pain which did not respond to oxycodone PCA, boluses and infusion. There was significant improvement with 25mg ketamine bolus. He required further boluses of ketamine, clonidine and midazolam during first post op night.

Average pain scores



Pain management

Patient described the pain much worse than the pre-op pain. He was established on ketamine infusion, regular oxycodone MR, PCA oxycodone with background infusion, regular tramadol, boluses of clonidine and pregabalin all in maximum dose .

He still needed boluses of ketamine and midazolam to control pain and to reduce distress. He had background burning type pain with intermittent paroxysmal shooting pain every 5 to 7 minutes.

Acute pain team was involved immediately post op and adolescent psychiatry team assessed him on the second post op day. The psychiatrist concluded that he was not suicidal but impulsive and in a distressed state. She recommended that patient shouldn't be left on his own at any time.

We managed to wean off ketamine infusion only after six days post op. By that time he was on high doses of oxycodone, tramadol, clonidine, pregabalin and citalopram. Pain team started oxycarbazepine, which contributed to his pain control, improved his mood and probably reduced his anxiety.

Discussion

Intractable pain
Pain that is not relieved by ordinary medical, surgical, and nursing measures. The pain is often chronic and persistent and can be psychogenic in nature(1).

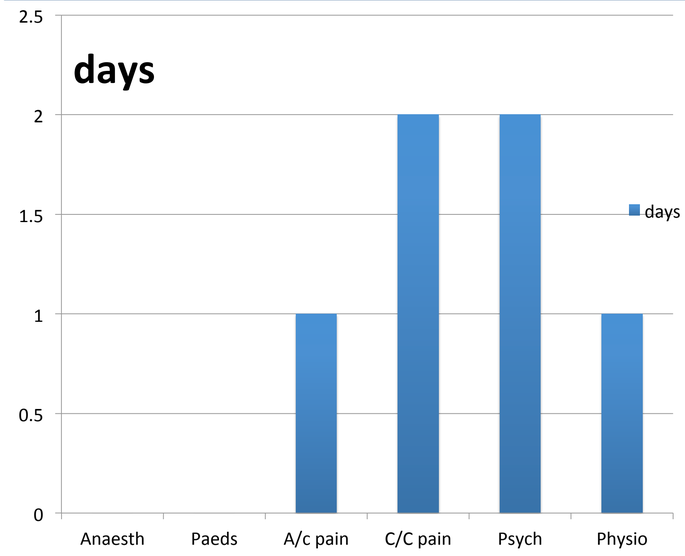
Avulsion injury to brachial plexus occur most commonly during motorcycle accidents when the arm and shoulder are severely stretched during the collision. The lesion is usually pre ganglionic. This leads to loss of function and central deafferentation pain that persists and becomes intractable and difficult to treat(2).

It is probable that brachial plexus injury affects mainly the CNS structures that can suffer influences from the PNS, giving rise to a mixed neuropathic pain syndrome with major central components(3). Behavioral, cognitive, and emotional factors that are believed to contribute to the perpetuation, if not the development, of chronic pain and pain-related disability and emotional distress(4). Role of psychiatrist in chronic pain is often misunderstood. They should be involved with the care of patients with chronic pain as early as possible to maximize outcome(5).

This case is different that the early onset of intractable pain was refractory to medical treatment. The surgical intervention possibly adding to the intensity of pain from an unknown mechanism. The underlying mental health issues and complex socioeconomic background have contributed to the severity of pain. Early multidisciplinary input with psychotherapy, acute and chronic pain management had significant effect in improving his condition.

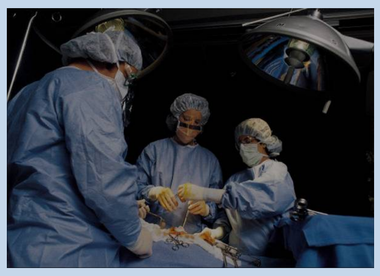
Brachial plexus injury leading to spinal cord root avulsion in humans produces a characteristic constant crushing and intermittent shooting pain, which is often intractable(6). Combinations of drugs including strong opioids, magnesium, clonidine and antineuropathic drugs are important in intractable pain in nerve injury. Low dose ketamine produces strong analgesia in neuropathic pain states, presumably by inhibition of the N-methyl-D-aspartate receptor although other mechanisms are possibly involved, including enhancement of descending inhibition and anti-inflammatory effects at central sites(7). Prolonged infusions of ketamine (4-14 days) showed to give long term analgesic effects (upto three months).

Early Multispecialty involvement



SIGN guidelines on management of c/c pain

Step 1 Diagnosis
Step 2 Amitriptyline, Gabapentin,pregabalin
Step 3 Alternate Agents: Alternate Tricyclic antidepressents, SNRI antidepressents, Alternate antiepilepsy drugs
Step 4 Topical agents: Topical lidocaine, capsaicin
Step 5 Opioids
Step 6 Specialist therapies: Ketamine, specialised interventions, Multidisciplinary assessment with appropriate psychological therapies



References

1. Mosby's Medical Dictionary, 8th edition. © 2009, Elsevier.
2. .Samii M, Bear-Henney S, Ludemann W, Tatagiba M, Blomer U. Treatment of refractory pain after brachial plexus avulsion with dorsal root entry zone lesions. Neurosurgery 2001 June; 48(6):1269-75.
3. M. J. Teixeira, M. G. da S da Paz et al. Neuropathic pain after brachial plexus avulsion – central and peripheral mechanisms. BMC Neurology (2015) 15:73.
4. R. D. Kerns, J. Sellinger, and B. R. Goodin. Psychological Treatment of Chronic Pain. Annual Review of Clinical Psychology. April 2011; Vol. 7: 411-434
5. Clark M. R. Psychiatric issues in chronic pain. Current Psychiatry Rep. 2009 Jun;11(3): 243-50.
6. J. S Berman, R. Birch, P. Anand. Pain following human brachial plexus injury with spinal cord root avulsion and the effect of surgery. Pain 75 (1998) 199–207.
7. Marieke Niesters, Christian Martini & Albert Dahan. Ketamine for chronic pain: risks and benefits. Br J Clin Pharmacol / 77:2 / 357–367.